DRAFT
ENGINEERING EVALUATION
ENTERPRISE UNDERPASS STORM WATER PUMP STATION
CITY OF RICHMOND
PLANT NO. 17301
APPLICATION NO. 13386

BACKGROUND

The City of Richmond is applying for an Authority to Construct and/or Permit to Operate for the following equipment:

S-1 Stationary Standby Generator: Diesel Engine; Make: Cummins Model: 4BTA3.9-G5; Rated Horsepower: 99 HP

The standby generator will be used at Enterprise Avenue in Richmond, CA 94801.

The generator set will provide emergency power (in the event of a blackout) for all essential electricity power at the City of Richmond- Enterprise Underpass storm water pump station facility. This emergency engine must be periodically tested to ensure that they will generate when needed. Since generator set S-1 will be located at a distance of approximately 500 feet from the Peres Elementary School boundary line, the engine will not be allowed to operate between the hours of 7:30 p.m. and 3:30 p.m. on days when school is in session.

EMISSIONS SUMMARY

Annual Emissions:

The CARB Certified emission factors for S-1 (99 HP- diesel engine, U-R-002-0267) are listed in Table 1 below:

Table (1)

Component	Emission (g/kW-hr)	Emission (g/hp-hr)
NOx	6.25	4.658
CO	0.51	0.380
POC	0.59	0.440
PM_{10}	0.2	0.149
SO_2	0.247	0.184

**The emission factor for SO2 is from Chapter 3, Table 3.4-1 of the EPA Document AP-42, Compilation of Air Pollutant Emission Factors.*

SO_2 8.09E-3 (% S in fuel oil) lb/hp-hr = 8.09E-3 (0.05% S) (454 g/lb) = 0.184 g/hp-hr

Component		g/bhp-hr	hp	hr/yr	lb/g		lb/yr		TPY
NOx	=	4.658	99	50	0.0022046	=	50.8317	=	0.0254158
CO	=	0.380	99	50	0.0022046	=	4.14685	=	0.0020734
POC	=	0.440	99	50	0.0022046	=	4.80162	=	0.0024008
PM10	=	0.149	99	50	0.0022046	=	1.626	=	0.0008130
SO2	=	0.184	99	50	0.0022046	=	2.00795	=	0.0010040

Maximum Daily Emissions:

A full 24-hour day will be assumed since no daily limits are imposed on intermittent and unexpected operations.

POLLUTANT		g/bhp-hr	hp	hr/day	lb/g		lb/day
NOx	=	4.658	99	24	0.0022046	=	24.39921
CO	=	0.380	99	24	0.0022046	=	1.990489
POC	=	0.440	99	24	0.0022046	=	2.304777
PM10	=	0.149	99	24	0.0022046	=	0.780481
SO2	=	0.184	99	24	0.0022046	=	0.963816

Plant Cumulative Increase: (tons/year)

POLLUTANT	Existing	New	Total
NOx		0.025416	0.025416
CO		0.002073	0.002073
POC		0.002401	0.002401
PM10		0.000813	0.000813
SO2		0.001004	0.001004

Toxic Risk Screening:

The toxic emission of diesel particulate does exceed the District Risk Screening Trigger, as shown in Table (1) below. A Risk Screening Analysis has been performed.

Table 1

Source	PM_{10} Emission Factor (g/bHP-hr)	HP	Annual Usage (Hours/year)	Diesel Exhaust Particulate Emissions (lb/year)	Trigger Level (lb/yr)	Risk Screen Required? (Yes/No)
1	0.149	99	50	1.625992063	0.58	YES

Since the engine meets Best Available Control Technology for Toxics (TBACT) requirements (emission level of 0.15 g/hp-hr or less), the maximum acceptable cancer risk is estimated at 10 in a million. Results from the health risk screening analysis show that for 50 hours of operation per year, excluding periods when operation is required due to emergency conditions, the risk to the maximally exposed nearest receptor is 2.8 in a million. The analysis was performed at a PM_{10} emission of 1.626 lb/year. In accordance with the District's Regulation 2, Rule 5, this risk level is considered acceptable.

The ISCST3 air dispersion computer model was used to estimate annual average ambient air concentrations. Stack and building parameters for the analysis were based on information provided by the applicant. Estimates of residential risk assume potential exposure to annual average TAC concentrations occur 24 hours per day, 350 days per year, for a 70-year lifetime. Risk estimates for offsite workers assume potential exposure occurs 8 hours per day, 245 day per year, for 40 years. For students, the assumptions include higher breathing rates for children, and potential exposures occur 10 hours per day, 180 days per year, over a 9-year period. However, since the engine is not allowed to operate between 7:30 a.m. and 3:30 p.m. on days when the school is in session, potential exposure to students is considered negligible.

The manufacturer supplied, ISO 8178-D2 test cycle data to CARB. The CARB staff has determined that the Cummins engine model listed above is in compliance with the PM emission requirements (0.15g/bhp-hr) from California Code of Regulations Title 17, Section 93115 (e)(2)(A) 3., (Table 1: Summary of the Emission Standards and Operating Requirements for New Stationary Emergency Standby Diesel-Fueled CI Engines > 50 BHP). Therefore, the above Cummins engine model qualifies for use in California for standby generator set applications operating at 50 hours per year for maintenance and testing.

STATEMENT OF COMPLIANCE

S-1 will be operated as an emergency standby engine and therefore is not subject to the emission rate limits in Regulation 9, Rule 8 ("NOx and CO from Stationary Internal Combustion Engines"). S-1 is subject to the monitoring and record keeping requirements of Regulation 9-8-530 and the SO2 limitations of 9-1-301 (ground-level concentration) and 9-1-304 (0.5% by weight in fuel). Regulation 9-8-530 requirements are incorporated into the proposed permit conditions. Compliance with Regulation 9-1 is expected since diesel fuel with a 0.05% by weight sulfur is mandated for use in California. Like all sources, S-1 is subject to Regulation 6 ("Particulate and Visible Emissions"). This engine is not expected to produce visible emissions or fallout in violation of this regulation and they will be assumed to be in compliance with Regulation 6 pending a regular inspection.

This diesel engine is subject to the Stationary Diesel Engine Air Toxics Control Measure (ATCM) and is considered a new stationary emergency standby diesel engine since it will be installed after January 1, 2005 and is larger than 50 HP. The requirements of the ATCM will be include in the permit conditions.

This application is considered to be ministerial under the District's proposed CEQA guidelines (Regulation 2-1-312) and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emission factors in accordance with Permit Handbook Chapter 2.3.

The project is within 1000 feet from the nearest school and therefore subject to the public notification requirements of Reg. 2-1-412.

Best Available Control Technology:

In accordance with Regulation 2, Rule 2, Section 301, BACT is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, NOx, CO, SO_2 or PM_{10}.

Based on the emission calculations above, the owner/operator of S-1 is subject to BACT for the following pollutants: NOx. BACT 1 levels do not apply for 'engines used exclusively for emergency use during involuntary loss of power' as per Reference b, Document 96.1.2 of the BAAQMD BACT Guidelines for IC Engines. Hence, the owner/operator has to meet the BACT 2 limits presented below.

POLLUTANT	BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice 3. TBACT	TYPICAL TECHNOLOGY
NOx	1. *1.5 g/bhp-hr [107 ppmvd @ 15% O_2] a,b* 2. *6.9 g/bhp-hr [490 ppmvd @ 15% O_2] a,b,c* 3. *6.9 g/bhp-hr [490 ppmvd @ 15 % O_2]*	1. *Selective Catalytic Reduction (SCR) + Timing Retard + Turbocharger w/ Intercooler a,b* 2. *Timing Retard $\leq 4^o$ + Turbocharger w/ Intercooler a,b,c* 3. *Timing Retard $\leq 4^o$ + Turbocharger w/ Intercooler*

For NOx, the emission limit set by BACT 2 are met, as shown in Table (2) below.

Table (2)

Pollutant	Engine Emission Factors (g/hp-hr)	Emission Factor Limits as set by BACT 2 (g/hp-hr)	Have the limits been met?
NOx	4.658	6.9	YES

Therefore, S-1 is determined to be in compliance with the BACT 2 limits for NOx.

Since CARB certification data was used to establish the NOx emission factors, the BACT 2 emission limits have not been incorporated into the permit conditions and are assumed to be complied with through the design standards demonstrated by the CARB certification testing.

Offsets: Offsets must be provided for any new or modified source at a facility that emits more than 10 tons/yr of POC or NOx. Based on the emission calculations above, offsets are not required for this application.

PSD, NSPS, and NESHAPS do not apply.

PERMIT CONDITIONS

Application 13386; Enterprise Underpass Storm Water Pump Station – City of Richmond Plant 17301;
Conditions for S-1 Emergency Diesel Generator Set:

PC # 22893

1. The owner or operator shall operate the stationary emergency standby engine, only to mitigate emergency conditions or for reliability-related activities (maintenance and testing). Operating while mitigating emergency conditions and while emission testing to show compliance with this part is unlimited. Operating for reliability-related activities is limited to 50 hours per year.
   (Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)3)

2. The Owner/Operator shall equip the emergency standby engine(s) with:
   a. a non-resettable totalizing meter with a minimum display capability of 9,999 hours that measures the hours of operation for the engine.
   (Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(4)(G)(1))

3. Records: The Owner/Operator shall maintain the following monthly records in a District-approved log for at least 36 months from the date of entry. Log entries shall be retained on-site, either at a central location or at the engine's location, and made immediately available to the District staff upon request.
   a. Hours of operation (maintenance and testing).
   b. Hours of operation for emission testing.
   c. Hours of operation (emergency).
   d. For each emergency, the nature of the emergency condition.
   e. Fuel usage for engine.
   f. CARB Certification Executive Order for the engine.
   (Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, Subsection (e)(2)(F)(4)(I), Regulation 1-441, Toxics)

4. The Owner/Operator shall not operate stationary standby diesel-fueled CI engine for non-emergency use, including maintenance and testing, during the following periods:
   a. Between 7:30a.m. and 3:30p.m. on days when school is in session.
   (Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)1)

RECOMMENDATION

Issue an Authority to Construct to Enterprise Underpass Storm Water Pump Station – City of Richmond, Plant 17301; for the following source:

S-1 Stationary Standby Generator: Diesel Engine; Make: Cummins Model: 4BTA3.9-G5; Rated Horsepower: 99 HP

By:_____ Date:_____

Irma Salinas
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